United States Department of Agriculture
Cooperative State Research, Education, and Extension Service,
Office of the Administrator

# Annual Review for 2006
## Portfolio Review Expert Panel

## Portfolio 5.2 (New Soil, Air, and Water)

***Supporting Objective: Provide science-based knowledge and education to improve the management of soil, air, and water resources to support production and enhance the environment***

**CSREES *Goal: Protect and Enhance the Nation's Natural Resource Base and Environment***

***For the period 1999-2004***

**2006 INTERNAL REVIEW PORTFOLIO: STRATEGIC OBJECTIVE 5.2**
**(Objectives 6.1 and 6.2 in CSREES Strategic Plan 2007-2012)**

# Soil, Air, and Water

**Response to External Review Panel Recommendations from February 2005**

**and**

**Progress Report**

**through FY 1999 and FY 2004**

**August, 2006**

# 2004 INTERNAL REVIEW PORTFOLIO: STRATEGIC GOAL 5.2

## I. Background

This document was prepared in August 2006 as the internal review of Strategic Goal 5.2 for Fiscal Year 2004. It contains updates to the portfolio, responses to the comments of the external panel review and changes to criteria scores with accompanying justifications. This document is a result of the efforts of the National Program Leaders from the Natural Resources and Environment Unit in collaboration with CSREES Planning and Accountability.

- **The following knowledge areas (KAs) are included in Portfolio 5.2.**
  - 101: Appraisal of Soil Resources
  - 102: Soil, Plant, Water, Nutrient Relationships
  - 103: Management of Saline and Sodic Soils and Salinity
  - 104: Protect Soil from Harmful Effects of Natural Elements
  - 111: Conservation and Efficient Use of Water
  - 112: Watershed Protection and Management
  - 131: Alternative Uses of Land
  - 132: Weather and Climate
  - 133: Pollution Prevention and Mitigation
  - 141: Air Resource Conservation and Management
  - 403: Waste Disposal, Recycling and Reuse
  - 405: Drainage and Irrigation Systems and Facilities
  - 605: Natural Resource and Environmental Economics

- **When the portfolio was first reviewed?**

  February 1-3, 2005
  August 2006 (internal Agency review)

- **Portfolio score from the PREP in 2005: 81**

Portfolio 5.2 received an overall score of 81 from the panel in the 2005 PREP. Table I-2 below shows the breakdown of scores for different questions and criteria.

**Table I-2. Scoring of 5.2 PREP Expert Panel**

| Criteria | Recommendations | Previous Score | Current Score |
|---|---|---|---|
| **Relevance** | | | |
| 1. Scope | Provide more illustrations of Extension and Education | 3 | 3 |
| 2. Focus | Balance national needs and regional priorities | 3 | 3 |
| 3. Emerging Issues | Address critical shortages of trained manpower | 3 | 3 |
| 4. Integration | Measure public adoption of technology | 2 | 2 |
| 5. Multi-disciplinary | Incorporate social and economic issues into projects | 2 | 2.5 |

| Table I-2. Scoring of 5.2 PREP Expert Panel | | | |
|---|---|---|---|
| **Criteria** | **Recommendations** | **Previous Score** | **Current Score** |
| **Quality** | | | |
| 1. Significance | More evidence of outputs and findings | 2 | 2.5 |
| 2. Stakeholder | Need gap analysis | 2 | 2 |
| 3. Alignment | Need to explain CSREES priorities to stakeholders | 2 | 2.5 |
| 4. Methodology | Include social science/economics in RFA development | 3 | 3 |
| **Performance** | | | |
| 1. Productivity | Establish goals and target for all programs | 2 | 2 |
| 2. Comprehensiveness | Link performance indicators to outputs | 2 | 2 |
| 3. Timeliness | Need outcomes for extension to show timeliness | 2 | 2 |
| 4. Agency guidance | Integrate work among problem areas | 3 | 3 |
| 5. Accountability | Focus on performance indicators, outcomes and impacts | 2 | 2 |
| **Overall score** | | **81** | **85** |

- A brief summary of the PREP report, highlighting their specific recommendations

The panel notes the vast array of natural resource and environment related projects and programs covered in this portfolio. In view of this, the panel believes a good effort was made in preparing a comprehensive report with good illustration of the interconnectivity of the 13 Knowledge Areas presented. While there is a nice start in documenting the integration among research, education, and extension, it is incomplete. There is a good crosswalk with previous and current USDA strategic plans. However, the overall emphasis is research, and more data are needed on both extension and higher education.

Outputs are not really documented, are incomplete, and appear dated. It is difficult to assess significance. When faced with ambiguous terms or other questions, the panel gave the portfolio the benefit of the doubt. Through personal knowledge, panel members were aware of CSREES activities that were not apparent in the report. Information would be helpful on how many scientists and graduate students are involved, FTEs and dollars per knowledge area, major states, and number of publications. The panel suggests documenting the contribution of research, education, and extension for each knowledge area. It also recommends consolidating the 13 Knowledge Areas into six or seven. The panel would like to see greater coordination with stakeholders and partners.

The panel expressed concern about the lack of quantitative measures of productivity. Panel members stated the data are lacking for them to make intelligent observations. Productivity expectations should be explicitly defined. It is not satisfactory to rely on NPL site visits and word of mouth.

The panel acknowledges how important NPLs have been over the years. It also recognizes the dilemma of getting data at the national level to present a national picture. In developing goals, outcomes, and measures, CSREES should consider how it adds value and the unique role it plays. The panel sees very little evidence to illustrate the benefits derived from the dollars invested in NRE programs during 1999-2003. The panel would like to see more meaningful planning, collection, interpretation, and reporting of data about the successes of CSREES-funded projects.

## II. CSREES response to PREP recommendations that cross all portfolios

In response to directives from the Office of Management and Budget (OMB) of the President, CSREES implemented the Portfolio Review Expert Panel (PREP) process to systematically review its progress in achieving its mission by implementing the Portfolio Review Expert Panel (PREP) process. Since this process began in 2003 eleven expert review panels have been convened and each has published a report offering recommendations and guidance.

These external reviews occur on a rolling five year basis. In the four off-years an internal panel is assembled to examine how well CSREES is addressing the external panel's recommendations. These internal reports are crafted to specifically address the issues raised for a particular Portfolio. However, despite the fact that the external reports were all written independent of one another on Portfolios comprised of very different subject matter, several themes common to the set of review reports have emerged. This set of issues has repeatedly been identified by Portfolio Review Panels and requires an agency-wide response. The agency has taken a series of steps to effectively respond to those overarching issues.

### Issue I: Getting Credit When Credit is Due

*For the most part panelists were complimentary when examples showing partnerships and leveraging of funds were used. However, panelists saw a strong need for CSREES to better assert itself and its name into the reporting process. Panelists felt that, often times, principal investigators who conduct the research, education and extension activities funded by CSREES do not highlight the contributions made by CSREES. Multiple panel reports suggested CSREES better monitor reports of its funding and ensure that the agency is properly credited. Many panelists were unaware of the breadth of CSREES activities and believe their lack of knowledge is partly a result of CSREES not receiving credit in publications and other material made possible by CSREES funding.*

**Agency Response:**

In 2005, in an effort to address the issue of lack of credit being given to CSREES for funded projects, the Agency implemented several efforts likely to improve this situation.

First it developed a standard paragraph about CSREES's work and funding that project managers can easily insert into documents, papers and other material funded in part or entirely by CSREES. Second, the Agency is in the process of implementing the "One Solution" concept. The One Solution will allow for the better integration, reporting and publication of CSREES material on the web. In addition, the new Plan of Work, centered on the Logic Model framework, became operational in June 2006. The Logic Model framework is discussed in more detail below. Because of the new Plan of Work requirements and the Plan of Work Training conducted by the Office of Planning and Accountability (also described in more detail below), it will be simpler for state and local partners to line up the work they are doing with agency expenditures. This in turn will make it easier for project managers to cite CSREES contributions when appropriate.

**Issue II: Partnership with Universities**

*Panelists felt that the concept of partnership was not being adequately presented. Panelists saw a need for more detail to be made available. Questions revolving around long-term planning between the entities were common as were ones that asked how the CSREES mission and goals were being supported through its partnership with University partners and vice versa.*

**Agency Response:**
CSREES has taken several steps to strengthen its relationship with University partners. First, to the extent possible, implementing partners will be attending the CSREES strategic development exercise which is intended to help partners and CSREES fully align what is done at the local level. Second, CSREES has realigned the state assignments for its NPLs. Each state is now assigned to one specific NPL. By reducing the number of states on which any individual NPL is asked to concentrate and assigning and training NPLs for this duty, better communication between state and NPL leaders should occur. Finally, several trainings that focused on the POW were conducted by CSREES in geographic regions throughout the country. A major goal of this training was to better communicate CSREES goals to state leaders which will facilitate better planning between the universities and CSREES.

**Issue III: NPLs**
*Without exception the portfolio review panels were complimentary of the work being done by NPLs. They believe NPLs have significant responsibility, are experts in the field and do a difficult job admirably. Understanding the specific job functions of NPLs was something that helped panelists in the review process. Panelists did however mention that often times there are gaps in the assignments given to NPLs. Those gaps leave holes in programmatic coverage.*

**Agency Response:**
CSREES values the substantive expertise National Program Leaders bring to the Agency and therefore requires all NPLs to be experts in their respective fields. Given the budget constraints often faced by the agency, the agency has not always been able to fund needed positions and had to prioritize its hiring for open positions. In addition, because of the level of expertise CSREES requires of its NPLs, filling vacant positions quickly is not always possible. Often CSREES is unable to meet the salary demands of those it wishes to hire. It is essential that vacant positions not only be filled but with the most qualified candidate.

Operating under these constraints and given inevitable staff turnover, gaps will always remain. However, the establishment and drawing together of multidisciplinary teams required to complete the Portfolios has allowed the Agency to identify gaps in program knowledge and ensure that these needs are addressed in a timely fashion. To the extent that specific gaps are mentioned by outside panel experts heightens the urgency to fill them.

**Issue IV: Integration**
*Lack of integration has been highlighted throughout the panel reviews. While review panelists certainly noted in their reports where they observed instances of integration, panel reports almost without fail sought more documentation in this regard.*

**Agency Response:**
Complex problems require creative and integrated approaches that cut across disciplines and knowledge areas. CSREES has recognized that need and has undertaken steps to remedy this situation. CSREES has recently mandated that up to twenty percent of all NRI funds be put aside specifically for integrated projects. These projects cut across functions as well as disciplines and ensure that future Agency work will be better integrated. Finally, integration is advanced through the Portfolio process which requires cooperation across units and programmatic areas.

**Issue V: Extension**
*While most panels seemed satisfied at the level of discussion that focused on research, the same does not hold true for extension. There was a call for more detail and more outcome examples based upon extension activities. There was a consistent request for more detail regarding not just the activities undertaken by extension but documentation of specific results these activities achieved.*

**Agency Response:**
Outcomes which come about as a result of Extension are, by the very nature of the work, more difficult to document than the outcomes of a research project. CSREES has recently shuffled its strategy of assigning NPLs to serve as liaisons for states. In the past one NPL might serve as a liaison to several states or a region comprised of states. Each state will be assigned a specific NPL and no NPL will serve as the lead representative for more than one state. This will ensure more attention is paid to Extension activities.

In addition CSREES has also been in discussion with partners and they have pledged to do their best to address this issue. The new POW will make Extension based results and reporting a priority. With heavy emphasis being place on logic models by CSREES, this will have the effect of necessitating the inclusion of Extension activities into the state's POWs. This in turn will require more reporting on Extension activities and allow for the improved documentation of Extension impact.

**Issue VI: Program Evaluation**
*Panelists were complimentary in that they saw the creation of the Office of Planning and Accountability and portfolio reviews as being the first steps towards more encompassing program evaluation work. However, they emphasized the need to see outcomes and often times stated that the scores they gave were partially the result of their own personal experiences rather than specific program outcomes documented in the portfolios. In other words, they know first hand CSREES is having an impact but would like to see more systematic and comprehensive documentation of this impact in the reports.*

**Agency Response:**
The effective management of programs is at the heart of the work conducted at CSREES and program evaluation is an essential component of effective management. In 2003 the Portfolio Review Expert Panel and subsequent internal reviews was implemented. Over the past three years eleven portfolios have been reviewed by external panel members and each year this process improves. National Program Leaders are now familiar with the process and the staff of the Planning and Accountability unit has implemented a systematic process for pulling together the material required for these reports.

However, simply managing the process more effectively is not sufficient for raising the level of program evaluations being done on CSREES funded projects to the highest standard. Good program evaluation is a process that requires constant attention by all stakeholders and the agency has focused on building the skill sets of stakeholders in the area of program evaluation. The Office of Planning and Accountability has conducted trainings in the area of evaluation for both National Program Leaders and for staff working at Land grant universities. These trainings are available electronically and the Office of Planning and Accountability will be working with National Program Leaders to deliver these trainings to those in the field.

The Office of Planning and Accountability is working more closely than ever with individual programs to ensure successful evaluations are developed, implemented and the data analyzed. Senior leadership at CSREES has begun to embrace program evaluation and over the coming years CSREES expects to see state leaders and project directors more effectively report on the outcomes of their programs as they begin to implement more rigorous program evaluation. The new Plan of Work system ensures data needed for good program evaluation will be available in the future.

**Issue VII: Logic Models**
*Panelists were consistently impressed with the logic models and the range of their potential applications. They expressed the desire to see the logic model process used by all projects funded by CSREES and hoped not only would NPL's continue to use them in their work but, also, that those conducting the research and implementing extension activities would begin to incorporate them into their work plans.*

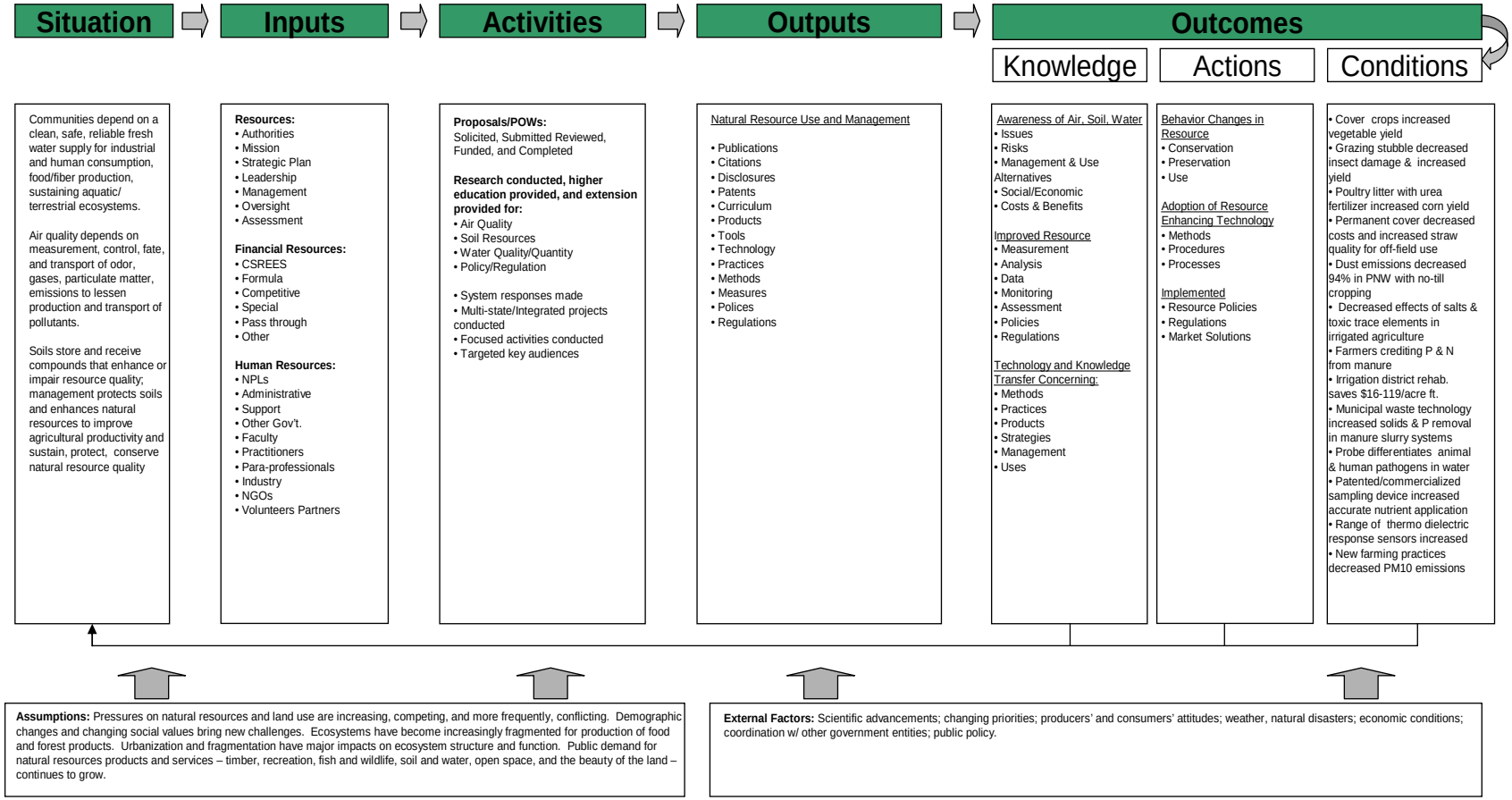
**Agency Response:**
Logic models have become a staple of the work being done at CSREES and the Agency has been very proactive in promoting the use of logic models to its state partners. Two recent initiatives highlight this. First, in 2005, the Plan of Work (POW) reporting system into which states submit descriptions of their accomplishments was completely revamped. The new reporting system now closely matches the logic models being used in Portfolio reports. Beginning in Fiscal year 2007 states will be required to enter all of the following components of a standard logic model. These components include describing the following:

- Program Situation
- Program Assumption
- Program Long Term Goals
- Program Inputs which include both monetary and staffing
- Program Output which include such things as patents
- Short Term Outcome Goals
- Medium Term Outcome Goals
- Long Term Outcome Goals
- External Factors
- Target Audience

The system is now operational and states are started using it June, 2006. By requiring the inclusion of the data components listed above, states are in essence, creating a logic model which CSREES believes will help better improve both program management and outcome reporting.

The second recent initiative by CSREES regarding logic models concerns a set of trainings conducted by Planning and Accountability staff. In October and November of 2005 four separate training sessions were held in Monterrey, California, Lincoln, Nebraska, Washington D.C. and Charleston, South Carolina. More than two hundred people representing land grant universities attended these trainings where they were given training in logic model creation, program planning and evaluation. Additionally, two training sessions were provided to NPLs in December 2005 and January 2006 to further familiarize them with the logic model process. Ultimately it is hoped these representatives will pass on to others in the land grant system what they learned about logic models thus creating a network of individuals utilizing the same general approach to strategic planning. These materials have also been made available to the public on the CSREES website.

# Portfolio: Natural Resources Logic Model




**Assumptions:** Pressures on natural resources and land use are increasing, competing, and more frequently, conflicting. Demographic changes and changing social values bring new challenges. Ecosystems have become increasingly fragmented for production of food and forest products. Urbanization and fragmentation have major impacts on ecosystem structure and function. Public demand for natural resources products and services – timber, recreation, fish and wildlife, soil and water, open space, and the beauty of the land – continues to grow.

**External Factors:** Scientific advancements; changing priorities; producers' and consumers' attitudes; weather, natural disasters; economic conditions; coordination w/ other government entities; public policy.

Version 1.2

## III. National Program Leader's response to PREP recommendations regarding portfolio 5.2

The NPLs responsible for portfolio 5.2 identified the following set of issues raised specifically within the 5.2 portfolio review and drafted the following set of responses.

Relevance

1. Provide more illustrations on extension and education. Need to integrate research, education and extension.

    - The NRI air quality program is fully integrated. All proposals submitted in 2003 and funded in 2004 integrated research with education or extension. In 2004, an integrated extension and education proposal was solicited and funded for a national workshop on agricultural air quality.
    - Three programs (Managed Ecosystems, Biology Weedy and Invasive Species in Agroecosystems, and Air Quality) within the NRI commit at least 1/3 of their annual budget to Integrated Research, Education and Extension projects.

2. More clearly articulate how proposal selection balances national needs and regional priorities.

    - Widespread use of logic models in strategic planning of natural resources and environmental portfolios

3. Solicitation of stakeholder input should be based on outreach analysis. Demonstrate that national needs emerge from dialog sessions between national, state and local stakeholders.

    - A major air quality stakeholder is the USDA Agricultural Air Quality Taskforce that provides national needs. The total CSREES air quality portfolio (formula, special grants, and competitive) has given presentations to the taskforce. The NRI Air Quality program's emphasis areas are closely aligned to the taskforce recommendations.

4. Need to address critical shortages of trained manpower in key areas.

    - Competitive grant programs supervised by enr NPLs have become more integrated in nature to increase educational and extension components linked to research activities.
    - Several new collaborations with SERD have been established, starting in FY 2006. Two of the eight FY '06 Targeted Expertise Shortage Areas (TESA) were TESA # 2: Natural Resources and Environment – particularly in forest ecosystem health and restoration and TESA # 3: Agricultural Systems and Natural Resources Engineering – especially wood and fiber engineering. Similarly, applications to 1890 Capacity Building Grants Program focus on several NRE/***enr*** disciplines including Soil, Air and Water.
    - The McIntire-Stennis program maintains records funding of graduate and post-graduate students in various fields of forestry science.

5. Lag in involvement in areas of critical need, years after topic addressed by many other agencies. Need to collaborate more with other agencies. CSREES is often late to establish a presence in emerging areas.

    - The Global Change and Climate Program has consistently collaborated with other federal agencies in preparing joint solicitations under a completive grant process which addresses critical needs identified by the US Climate Change Science Strategic Plan.

6. Explicitly request multi-disciplinary balance in formula funds and RFAs because many problems are not addressed by multi-disciplinary teams. Incorporate social and economic issues into projects.

    - The Integrated Water Quality Program included social and economic sciences in two program areas – Conservation Effects Assessment Project and the Integrated Water Quality Program. These priority areas for research, education, and extension were aimed at improving understanding of social and economic factors affecting behavior change among water users.
    - The air quality program has solicited socioeconomic foci in the most recent RFA.
    - Use "agroecology," as an overarching theme in the NRI and in ENR to integrate agricultural, natural and human components. Viewing agriculture as part of an ecological system as well as a human dominated socio-economic system produces a broad range of performance criteria including ecological goods and services, sustainability, food security, economic viability, resource conservation, social equity, as well as increased production.

Quality

1. Need to do a better job explaining its 5-year priorities.

    - The National Integrated Water Quality Program has established a set of priorities for integrated research, education, and extension projects. These priorities change approximately every three years to reflect current priorities within the water resources program and the water research, education, and extension, community.
    - All NRI program have 10 year goals that are provided in the RFA

2. Need more info on how projects build on previous work.

    - National Program Leaders evaluate formula funded projects as part of the overall program portfolio and has resulted in a change in attitude towards the use of these types of funds to achieve program objectives on the national and regional level.
    - The recently funded Agricultural Air Quality Workshop will bring together all CSREES funded research in addition to other federal, state, and privately funded agricultural research to develop assessment reports on agricultural emissions and control technologies that reduce emissions.

3. Engage non-traditional stakeholder groups to better focus on solving problems.

    - The Water Quality Program has a focused effort to address the needs of urban populations through its Agriculture Water Security initiative.
    - Underserved or underrepresented audiences also were a special focus of the Integrated Water Quality Program. Through this focused effort, grants were awarded to a Tribal Community College (Salish Kootenai) and a historically black university (Tennessee State) to facilitate increased capacity among scientists and educators at these institutions. The ultimate goal of these awards was to improve efforts to reach under-served audiences among minority and Native American agricultural producers.

4. Need better documentation on stakeholder input. Need to hold stakeholder sessions on natural resources and environmental economics.

Performance

1. Need to distinguish productivity between formula, competitive and appropriated funding.

    - A considerable set of program impacts was developed through the Integrated Water Quality Program Impacts Report. This report includes research, education, and extension impacts and outcomes.
    - The air quality assessment reports will help us determine which categories have been more productive.

2. Timeliness of projects not clearly documented. Need to establish procedures for assessing timeliness of research grants.

    - This is addressed by the agency as Issues IV and VI above.

3. Need to show how many projects met their objectives for research, education and extension.

    - A considerable set of program impacts was developed through the Integrated Water Quality Program Impacts Report. This report includes research, education, and extension impacts and outcomes.
    - The air quality program has been holding annual all investigator meetings to document progress on project objectives.

4. Need to emphasize innovative projects and show CSREES leadership in development.

    - The Conservation Effects Assessment Project competitive grants program was jointly managed by CSREES and NRCS in FY 2004 – FY 2006. That program was established for three years (ending in FY 2006). Discussions now are underway to explore reallocation of the resources committed to that effort.

5. Need to show long-term outcomes better.

    - Metrics will be defined consistently across the knowledge areas to better address outputs and outcomes.
    - Long Term Agroecosystem Program (LTAR) would use systems science to test the degree to which agriculture can be ecologically and economically sustainable, a critically important goal that clearly falls within the domain of the USDA. This would be a long-term (20+ year) activity

Future Directions

1. Need consistency in documenting the level of action and recognition of integrated and multidisciplinary activities.

    - This is addressed by the agency as Issues IV and VI above.

2. Develop and nurture the ENR network to integrate disciplines. Identify particular strengths.

    - The ENR network is developing its strategic plan to integrate across scientific disciplines and integrate researcher education and extension activities throughout the knowledge areas.
    - Use of "agroecology," as an overarching theme in the NRI and in ENR to integrate agricultural, natural and human components. Viewing agriculture as part of an ecological system as well as a human dominated socio-economic system produces a broad range of performance criteria including ecological goods and services, sustainability, food security, economic viability, resource conservation, social equity, as well as increased production.

3. Need to develop more multidisciplinary research, education and extension efforts across institutions (e.g. land grant and non-land grant) and organizational partners (e.g. federal and state agencies). Encourage multidisciplinary and integrated efforts with formula funds.

    - eXtension will facilitate the integration of research, education and extension activities throughout the agency.

4. Need to eliminate barriers to equally valuing research, education and extension.

    - The National Integrated Water Quality Program has established a set of priorities for integrated research, education, and extension projects. These priorities change approximately every three years to reflect current priorities within the water resources program and the water research, education, and extension, community.

5. Include economics and other social sciences into an organizational paradigm for better impacts.

- The Integrated Water Quality Program included social and economic sciences in two program areas – Conservation Effects Assessment Project and the Integrated Water Quality Program. These priority areas for research, education, and extension were aimed at improving understanding of social and economic factors affecting behavior change among water users.

6. Continue assessment process to include CSREES partners and other federal agencies.

    - The air quality assessment reports will allow for stakeholder input from all sectors. The reports will be submitted to the National Academies of Science for their review and input. Review by the Academies will give further credibility to our federal partners such as the EPA.

## IV. Updates of the self-assessment paper

### 1. Budget

The budget for Natural Resources and Environment Programs has remained steady over the past years and reflects the overall budget of CSREES. Industry and non-federal grants provided substantial increase in funds in 2004 and 2004. All knowledge area under the portfolio have generally been steady over the past years with changes in specific areas of interest reflecting increase in certain parts of the portfolio while drawing form other programs. This also reflects the operational aspect of the general portfolio which follows program under National Program Leaders rather than specific knowledge areas which overlap between and among programs. KA 141 (Air Resource Conservation and Management) is a new program which was initiated in late 2004 and funds under these program will be reflected in 2005. This KA is presented to show that the portfolio continues to grow by adding knowledge areas and is making progress in addressing important environmental issues.

**Table 1: CSREES Research Funding for Portfolio 5.2 by Source during 1999-2004**

| | **Fiscal Year *(in thousands)*** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Funding Source** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **Grand Total** |
| **Hatch** | 25,433 | 24,248 | 24,537 | 23,179 | 23,175 | 22,816 | **143,388** |
| **McIntire-Stennis** | 3,859 | 3,570 | 3,239 | 3,829 | 3,396 | 3,604 | **21,497** |
| **Evans Allen** | 4,564 | 4,455 | 4,262 | 4,565 | 3,560 | 3,588 | **24,994** |
| **Animal Health** | 0 | 0 | 0 | 0 | 11 | 10 | **21** |
| **Special Grants** | 6,338 | 5,487 | 5,608 | 8,659 | 11,597 | 8,544 | **46,233** |
| **NRI Grants** | 10,559 | 3,952 | 15,250 | 12,498 | 13,733 | 11,271 | **67,263** |
| **SBIR Grants** | 1,731 | 1,020 | 2,208 | 2,785 | 1,940 | 1,709 | **11,393** |
| **Other CSREES** | 14,226 | 22,401 | 35,351 | 19,051 | 20,538 | 24,613 | **136,180** |
| **Total CSREES** | **66,710** | **65,133** | **90,455** | **74,566** | **77,939** | **76,155** | **450,969** |

*Source: Current Research Information System*

**Table 2: Funding from All Sources for Portfolio 5.2 during 1999-2004**

| Sources of funding | Fiscal Year *(in thousands)* | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **Grand Total** |
| **CSREES** | 66,710 | 65,133 | 90,457 | 74,566 | 77,943 | 76,154 | **450,963** |
| **Other USDA** | n/a | n/a | n/a | n/a | 13,109 | 14,838 | **27,947** |
| **Other Federal** | 42,488 | 46,548 | 55,340 | 67,778 | 55,408 | 63,598 | **331,160** |
| **State Appropriations** | 158,493 | 170,109 | 167,650 | 174,383 | 134,627 | 139,793 | **945,055** |
| **Private or Self Generated** | 13,425 | 12,336 | 12,502 | 12,073 | 11,167 | 11,934 | **73,437** |
| **Industry Grants and Agreements** | n/a | n/a | n/a | n/a | 21,615 | 20,320 | **41,935** |
| **Other non-federal** | n/a | n/a | n/a | n/a | 23,753 | 27,862 | **51,615** |
| **Grand Total** | **281,116** | **294,126** | **325,949** | **328,800** | **337,622** | **354,499** | **1,922,118** |

*Source: Current Research Information System*

**Table 3: CSREES Funding for Portfolio 5.2 by Knowledge Area during 1999-2004**

| Knowledge Areas | Fiscal Year *(in thousands)* | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **Grand Total** |
| **101- Appraisal of Soil Resources** | 4,040 | 3,248 | 5,741 | 4,605 | 4,544 | 3,444 | **25,622** |
| **102- Soil, Plant, Water, Nutrient Relationships** | 15,472 | 13,887 | 22,402 | 15,816 | 17,076 | 12,521 | **97,174** |
| **103- Management of Saline and Sodic Soils and Salinity** | 596 | 514 | 909 | 464 | 333 | 286 | **3,102** |
| **104- Protect Soil from Harmful Effects of Natural Elements** | 978 | 929 | 2,110 | 1,887 | 1,085 | 1,271 | **8,260** |
| **111- Conservation and Efficient Use of Water** | 4,740 | 2,384 | 3,238 | 6,280 | 8,746 | 7,842 | **33,230** |
| **112- Watershed Protection and Management** | 7,229 | 12,305 | 18,221 | 14,624 | 12,654 | 15,177 | **80,210** |
| **131- Alternative Uses of Land** | 970 | 1,328 | 5,929 | 1,385 | 2,825 | 1,145 | **13,582** |
| **132- Weather and Climate** | 1,574 | 1,514 | 1,956 | 1,509 | 4,250 | 5,566 | **16,369** |
| **133- Pollution Prevention and Mitigation** | 17,196 | 16,999 | 19,655 | 16,904 | 15,047 | 16,480 | **102,281** |
| **141- Air Resource Conservation and Management** | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **403- Waste Disposal, Recycling and Reuse** | 8,910 | 5,635 | 4,445 | 5,226 | 4,498 | 6,197 | **34,911** |
| **405- Drainage and Irrigation Systems and Facilities** | 958 | 907 | 1,295 | 874 | 1,144 | 1,715 | **6,893** |
| **605- Natural Resource and Environmental Economics** | 4,087 | 5,514 | 4,843 | 5,006 | 5,741 | 4,510 | **29,701** |
| **Grand Total** | **66,750** | **65,164** | **90,744** | **74,580** | **77,943** | **76,154** | **451,335** |

*Source: Current Research Information System*

## 2. The Environmental and Natural Resources Enterprise

The Natural Resources and Environment (NRE) Unit of CSREES is responsible for the implementation of Strategic Goal 5.1. The unit realized even before the portfolio review the need to better address its environmental and natural resources function of the agency. This function goes beyond that of the NRE Unit and involves all National Program Leaders (NPLs) who have a background in environmental and natural resources issues and have personal interest, skills knowledge and experience in the area. The idea was not to reorganize the agency but to work within the administrative bounds in ways that enhance CSREES's effectiveness in dealing with its mission to serve the public and its partners. In 2003, National Program Leaders from NRE and other units of CSREES got together to envision the Environmental and Natural Resources (ENR) Enterprise. The development of ENR is undergoing rapid development especially in light of the PART of strategic goals 5.1 and 5.2.

The challenge for the Environmental and Natural Resources Enterprise is to increase the knowledge necessary to mitigate or adapt to the potential magnitude of environmental changes and their feedbacks in agricultural, forestry and rangeland ecosystems to help society respond effectively. Research, educational and extension activities for this initiative would focus on the complexity of changes in ecosystem processes and their frequency and intensity, particularly those that have significant consequence for society. These activities will enable society to better protect its natural resources and environment for societal needs. The national program leaders from the NRE unit and other natural resources and environment programs within CSREES are identifying and apriority research topics in support of an ENR working plan and develop a common goal that is implementable across the various programs. The agroecosystem, as an organizing theme for the ENR Enterprise, can be applied at a range of spatial scales including the field, family, the farm level enterprise, the landscape, watershed, institutional or community scale within agricultural, rangeland, forested, or community systems. A logic model of an agroecosystem upon which all ENR programs and linkages can be mapped and their linkages defined is presented below. Viewing agriculture as part of an ecological system as well as a human dominated socio-economic system produces a broad range of performance criteria including ecological goods and services, sustainability, food security, economic viability, resource conservation, social equity, as well as increased production.

Successful research education and extension activities for the ENR Enterprise requires collaboration from within CSRESS, USDA and across other federal agencies but more so from the partnerships with the Land Grant Universities. This is needed to address the scientifically important and socially relevant issues facing government and society. This is also important in meeting goal 5 of CSREES' strategic plan in an integrated and holistic manner and over time will address all the issues raised in the PART review.

## V. 2006 score changes for 5.2 portfolio

After evaluating all the updated information of the portfolio up to 2004, the national program leaders have identified three categories where significant progress have been identified that justifies changes in score.

1) Relevance, Multi-disciplinary: The water quality program which makes up a large component of the portfolio in terms of knowledge area coverage, through the Conservation Effects and Assessment Projects has greatly improved understanding of social and economic factors affecting behavior change among water users. Socioeconomics has also been an important focus area in the air quality program and agroecology is a concept that is being used to integrate social and economic sciences within the portfolio. The National Program Leaders consider this progress to change the score of 2.0 to 2.5.
2) Quality, Significance: Both the water quality and air quality programs have produced impacts reports that document research, education and extension impacts and outcomes. National Program Leaders have also been more engaged with their respective communities by holding investigator meetings and attending other forums to interact with academic and extension partners. The National Program Leaders consider this progress to change the score of 2.0 to 2.5.
3) Quality; Stakeholder: All knowledge areas related to water have begun to address the need of urban populations through a broad Agriculture Water Security Initiative. There has also been an increase in tribal colleges and historical black college's participation in this part of the portfolio. The National Program Leaders consider this progress to change the score of 2.0 to 2.5.

## VI. Summary

The portfolio has identified a few areas where progress was achieved in 2004 that merit an increase in its score. There have been, however, significant changes in terms of strategic planning and implementation that will result in more significant outcomes and impacts in the years to come. The National Program Leaders have been in the process of planning its overall approach to the portfolio even before the external review and these plans are now in the process of final stage of development and will son be implemented to achieve the goals of the portfolio.

The Environmental and Natural Resources (ENR) enterprise will employ three integrative strategies that will guide its National Program Leaders in establishing priorities, identifying opportunities, and designing new programs and activities. This will cut across all related CSREES programs and activities, and each is critical to accomplishing CSREES's Strategic Goal to "Protect and Enhance the Nation's Natural Resource Base and Environment" (Strategic Goal 5).

1. Develop Intellectual Capacity

ENR programs will invest in projects that enhance individual and collective capacity to discover, learn, create, and identify problems and formulate solutions with respect to the principles and needs

of our partners and stakeholders. This strategy will develop a competitive agricultural workforce. In all of ENR's research programs, developing new knowledge will incorporate educating and mentoring students, and informing the public through outreach.

2. Integrate Research, Education and Extension

ENR programs will invest in activities that integrate research, education and extension, and that develop reward through effective integration at all levels. Programs will also ensure that the findings and methods of research are quickly and effectively communicated in a broader context and to a larger audience. This strategy is vital to the accomplishment of its strategic goals.

3. Promote Partnerships

ENR programs will promote collaboration and partnerships between disciplines and institutions and among academe, industry and government to enable the movement of research, education and extension throughout the public and private sectors. ENR partnerships will optimize the impact of research, education and extension on the economy and on society through its stakeholders.